1   What is claimed is:

2   1.   A process for correcting a time axis of local chromatographic data to match

3   reference chromatographic data while maintaining peak areas, comprising:

4   obtaining reference calibration data from a reference chromatographic system;

5   obtaining local calibration data from a local chromatographic system;

6   generating local system correction functions based on an appropriate

7   mathematical relationship using the reference calibration and the local calibration data;

8   and

9   applying the local system correction functions to local chromatographic data to

10   generate corrected local chromatographic data,

11   wherein the corrected local chromatographic data match with the reference

12   calibration data on time axis and wherein peak areas in the local chromatographic data are

13   maintained in the corrected local chromatographic data.

14

15   2.   The process of claim 1, wherein the local system correction functions include a

16   smoothed x-axis correction function and a y-axis correction function generated using one

17   or more mathematical curve fitting techniques, said y-axis correction function is a first

18   derivative of the x-axis correction function.

19

20   3.   The process of claim 2, wherein the one or more mathematical curve fitting

21   techniques are selected from the group consisting of linear regression, polynomial

22   regression, logarithmic regression, cubic splining, and exponential regression.

23

24   4.   The method of claim 2, wherein the local system correction functions are applied

25   to the local chromatographic data through steps of:

26   (1) determining a retention time correction (Δrt) from the smoothed x-axis

27   correction function for a given reference retention time (rt);

28   (2) copying a y value that is at retention time (rt + Δrt) in the local

29   chromatographic data to rt;

30   (3) multiplying copied y value by (1+ $d\Delta rt/drt$), wherein $d\Delta rt/drt$ is determined

31   from the first derivative of the smoothed x-axis correction function;

32   repeating steps (1) to (3) with each retention time data point in the local

33   chromatographic data to create corrected local chromatographic data.

1   5.   The process of claim 1, further comprising:

2   extrapolating the local system correction functions to extend over a local

3   chromatographic time frame of interest.

4

5   6.   The process of claim 1, further comprising:

6   setting up the reference chromatography method in a local chromatographic

7   system.

8

9   7.   The process of claim 6, further comprising:

10   locking the local chromatographic system to the reference calibration data with an

11   instrumental correction technique.

12

13   8.   The process of claim 7, wherein the instrumental correction technique is RTL I

14   method.

15

16   9.   The process of claim 1, further comprising:

17   translating the reference chromatographic method into a local chromatographic

18   method using a method translation technique on a local chromatographic system.

19

20   10.   The process of claim 9, further comprising:

21   fine tuning the local chromatographic method using an instrumental correction

22   technique.

23

24   11.   The process of claim 10, wherein the instrumental correction technique is RTL I

25   method.

26

27   12.   The process of claim 1, further comprising:

28   replacing an x-axis unit in the reference calibration data, or local calibration data,

29   or both, with a new x-axis unit.

30

31   13.   The process of claim 12, wherein the new x-axis unit is retention index, boiling

32   point, carbon number, molecular size, or molecular weight.

33

34

1 14.   The process of claim 1, further comprising:

2   replacing an y-axis unit in the reference calibration data, or local calibration data,

3 or both, with a new y-axis unit.

4

5 15.   The process of claim 14, wherein the new y-axis unit is concentration, percent,

6 weight, mass, moles, or mole fraction.

7

8 16.   The process of claim 1, further comprising:

9   applying the local system correction functions to adjust the local calibration data

10 and to generate time-axis correct local calibration data that maintains the peak areas of the

11 local calibration data;

12   determining a y-axis local system response correction function using the time-axis

13 correct local calibration data and the reference calibration data;

14   applying the y-axis local system response correction function to the local

15 chromatographic data.

16

17 17.   The process of claim 1, wherein the reference calibration data is obtained from the

18 reference chromatographic system using an reference chromatographic method and a

19 calibration mix containing at least two calibration compounds, and wherein the local

20 calibration data is obtained on the local chromatography system using the reference

21 chromatographic method and the same calibration mix.

22

23 18.   A process for correcting local chromatographic data with a reference retention

24 time database, comprising:

25   providing a reference retention time database;

26   running a calibration mix on the local system to generate local calibration data;

27   constructing local system correction functions to minimize differences between

28 the local calibration data and corresponding retention time values in the reference

29 retention time database for the calibration mix;

30   applying the local system correction functions to adjust local chromatographic

31 data; and

32   using adjusted local chromatographic data to search the reference retention time

33 database to obtain more accurate search results.

34

1   19.   The process of claim 18, further comprising:

2   locking a local system to the reference retention time database using an

3   instrumental method.

4

5   20.   The process of claim 19, wherein the instrumental method is RTL I method.

6

7   21.   A process for correcting local chromatographic data by generating a local

8   retention time database from a reference retention time database, comprising:

9   providing a reference retention time database;

10   locking a local system to the reference retention time database using an

11   instrumental method;

12   running a calibration mix on the local system to generate local calibration data;

13   constructing local system correction functions to minimize differences between

14   the local calibration data and corresponding retention time values in the reference

15   retention time database for the calibration mix;

16   applying the local system correction functions to adjust the reference retention

17   time database values to generate a local retention time database; and

18   searching the local retention time database using local chromatographic data.

19

20   22.   The process of claim 1, wherein generation of the local system correction

21   functions or the corrected local chromatographic data or both is performed at a remote

22   location through a network.

23

24   23.   The process of claim 22, wherein the network is a local network or the Internet.

25

26   24.   A process for correcting a time axis of local chromatographic data to match

27   reference chromatographic data while maintaining peak areas, comprising:

28   obtaining reference calibration data having a first and a last peak from a reference

29   chromatographic system;

30   obtaining local calibration data having a first and a last peak from a local

31   chromatographic system;

32   determining an time-axis simple linear function, $x' = mx + b$, that makes retention

33   times of the first and last peak of the local calibration data match retention times of the

34   first and last peak of the reference calibration data;

1   applying the time-axis simple linear function to the local calibration data to create

2   a time-axis transformed local calibration data;

3   dividing a y value of each time point in the time-axis transformed local calibration

4   data by m to produce transformed local calibration data with corrected local peak areas;

5   generating local system correction functions based on an appropriate

6   mathematical relationship using the reference calibration and the transformed local

7   calibration data;

8   obtaining local chromatographic data,

9   applying the time-axis simple linear function to local chromatographic data to

10   create a time-axis transformed local chromatographic data;

11   dividing a y value of each time point in the time-axis transformed local

12   chromatographic data by m to produce transformed local chromatographic data with

13   corrected local peak areas; and

14   applying the local system correction functions to the transformed local

15   chromatographic data to generate corrected local chromatographic data,

16   wherein the corrected local chromatographic data match with the reference

17   calibration data on time axis and wherein peak areas in the local chromatographic data are

18   maintained in the corrected local chromatographic data.

19

20   25.   An chromatographic apparatus for analyzing samples, comprising:

21   means for producing local chromatographic data; and

22   means for generating corrected local chromatographic data that match with

23   reference chromatographic data on a time axis while maintaining peak areas of the local

24   chromatographic data, comprising:

25   means for creating local system correction functions based on an

26   appropriate mathematical relationship using reference calibration data and local

27   calibration data; and

28   means for applying the local system correction functions to local

29   chromatographic data.

30

31   26.   The chromatographic apparatus of claim 25, wherein the means for generating

32   corrected local chromatographic data further comprising:

33   means for replacing an x-axis unit in the reference calibration data, or local

34   calibration data, or both, with a new x-axis unit.

1   27.   The chromatographic apparatus of claim 25, wherein the means for generating
2   corrected local chromatographic data further comprising:
3   means for replacing a y-axis unit in the reference calibration data, or local
4   calibration data, or both, with a new y-axis unit.
5
6   28.   The chromatographic apparatus of claim 25, wherein the means for generating
7   corrected local chromatographic data further comprising:
8   means for determining a y-axis local system response correction function; and
9   means for applying the y-axis local system response correction function to the
10   local chromatographic data.